What is claimed is:

1. A communication system using a sheet-type optical conductor comprising a sheet-type optical medium containing particles for reflecting light, and propagating an optical signal injected from one edge of said medium to the other having an optical receiver connected thereto by scattering said optical signal by means of said particles,

wherein said sheet conductor is designed such that the value of $\Phi \cdot Np \cdot L_G \cdot K_C$ is less than or equal to 0.9 where Φ is the scattering cross-sectional area of said particles, L_G is the length of said optical medium in the direction in which the light is propagated, Np is the density of said particles, and K_C is a correction coefficient.

2. The communication system according to claim 1, wherein said system satisfies the relationship of:

$$Pr(Noise(System\_rms) \cdot Q) \leqq BER(accept)$$

where Noise (system_rms) is the rms (root mean square) noise of said system, BER (accept) is the acceptable bit error rate of said system, Pr(Noise(System_rms)) is the probability of Noise(System_rms) of said system, and Q is a proportionality constant.

3. The communication system according to claim 1, wherein said system satisfies the relationship of:

$$\{S(PRmin)v-V(Thresh\}>Noise(System\_rms) \cdot Q$$

where, S(PRmin)v is the signal output voltage of said optical receiver which is determined by the minimum optical power

received by said receiver $P(Receiver\_min)_{dBm}$ and load resistance, V(Thresh) is any predetermined threshold level for digitization, Noise(System_rms) is the rms noise of said system, and Q is a proportionality constant, and

wherein said minimum optical power $P(Receiver\_min)_{dBm}$ is defined as:

$$P(Receiver\_min)_{dBm} = -10Log\{Pin \cdot Eout \cdot (NPi(min)/\Sigma NPi) \cdot \pi/4\} \cdot KT$$

where Pin is the input optical power of said sheet conductor, Eout is the light-extraction efficiency, NPi(min) is the optical power of the segment having the minimum optical power, ΣNPi is the sum of the optical power of the segments, KT is the total coupling loss of the light-emitting device, optical fiber, optical receiver, etc., and

wherein said light-extraction efficiency Eout is defined as:

$$Eout = \exp\{-(\Phi \cdot Np \cdot L_G \cdot K_C)\} \cdot K_L$$

where K_L is the total loss factor including the internal transmission factor of said sheet-type optical conductor and the like.

4. The communication system according to claim 2, wherein said system satisfies the relationship of:

$$\{S(PRmin)v-V(Thresh)\}>Noise(System\_rms) \cdot Q$$

where S(PRmin)v is the signal output voltage of said optical receiver which is determined by the minimum optical power received by said receiver $P(Receiver\_min)_{dBm}$ and load resistance,

and V(Thresh) is any predetermined threshold level for digitization, and

wherein said minimum optical power $P(Receiver\_min)_{dBm}$ is defined as:

$$P(Receiver\_min)_{dBm} = -10Log\{Pin \cdot Eout \cdot (NPi(min)/\Sigma NPi) \cdot \pi/4\} \cdot KT$$

where Pin is the input optical power of said sheet conductor, Eout is the light-extraction efficiency, NPi(min) is the optical power of the segment having minimum optical power, ΣNPi is the sum of the optical power of the segments, KT is the total coupling loss of the light-emitting device, optical fiber, optical receiver, etc., and

wherein, said light-extraction efficiency Eout is defined as:

$$Eout = \exp\{-(\Phi \cdot Np \cdot L_G \cdot K_C)\} \cdot K_L$$

where K_L is the total loss factor including the internal transmission factor of said sheet-type optical conductor and the like.

5. The communication system according to claim 1, wherein the optical signal injected into said sheet-type optical conductor is reflected in succession at the edges other than the input/output edges in accordance with Snell's Law, and said sheet-type optical conductor is made of an optical medium having a shape that satisfies the condition of $\sin \theta s > 1$, if $Nm \cdot \sin \theta m = Ns \cdot \sin \theta s$ when no particles are contained therein, where Ns is the index of refraction of the surrounding medium; and

Nm, Θm, and Θs are the index of refraction, angle of incidence, and angle of refraction of the base material of said optical medium respectively.

6. The communication system according to claim 2, wherein the optical signal injected into said sheet-type optical conductor is reflected in succession at the edges other than the input/output edges in accordance with Snell's Law, and said sheet-type optical conductor is made of an optical medium having a shape that satisfies the condition of sin Θs>1, if Nm · sin Θm = Ns · sin Θs when no particles are contained therein, where Ns is the index of refraction of the surrounding medium; and Nm, Θm, and Θs are the index of refraction, angle of incidence, and angle of refraction of the base material of said optical medium respectively.

7. The communication system according to claim 3, wherein the optical signal injected into said sheet-type optical conductor is reflected in succession at the edges other than the input/output edges in accordance with Snell's Law, and said sheet-type optical conductor is made of an optical medium having a shape that satisfies the condition of sin Θs>1, if Nm · sin Θm = Ns · sin Θs when no particles are contained therein, where Ns is the index of refraction of the surrounding medium; and Nm, Θm, and Θs are the index of refraction, angle of incidence, and angle of refraction of the base material of said optical medium respectively.

8. The communication system according to claim 4, wherein

the optical signal injected into said sheet-type optical conductor is reflected in succession at the edges other than the input/output edges in accordance with Snell's Law, and said sheet-type optical conductor is made of an optical medium having a shape that satisfies the condition of $\sin\theta s>1$, if $Nm \cdot \sin \theta m = Ns \cdot \sin \theta s$ when no particles are contained therein, where Ns is the index of refraction of the surrounding medium; and Nm, θm, and θs are the index of refraction, angle of incidence, and angle of refraction of the base material of said optical medium respectively.

9. The communication system according to claim 1, wherein the light beam exciting from at least one output edge of said sheet-type optical conductor follows Snell's Law in the reflection and refraction at said output edge, and said sheet-type optical conductor is made of an optical medium having a shape that satisfies the relationship of $\sin\theta s<1$, if $Nm \cdot \sin \theta m = Ns \cdot \sin \theta s$ when no particles are contained in said medium, where Ns is the index of refraction of the surrounding medium; and Nm, θm, and θs are the index of refraction, angle of incidence, and angle of refraction of the base material of the optical medium respectively.

10. The communication system according to claim 2, wherein the light beam exciting from at least one output edge of said sheet-type optical conductor follows Snell's Law in the reflection and refraction at said output edge, and said sheet-type optical conductor is made of an optical medium having

a shape that satisfies the relationship of $\sin \theta s<1$, if $Nm \cdot \sin \theta m = Ns \cdot \sin \theta s$ when no particles are contained in said medium, where Ns is the index of refraction of the surrounding medium; and Nm, θm, and θs are the index of refraction, angle of incidence, and angle of refraction of the base material of the optical medium respectively.

11. The communication system according to claim 3, wherein the light beam exciting from at least one output edge of said sheet-type optical conductor follows Snell's Law in the reflection and refraction at said output edge, and said sheet-type optical conductor is made of an optical medium having a shape that satisfies the relationship of $\sin \theta s<1$, if $Nm \cdot \sin \theta m = Ns \cdot \sin \theta s$ when no particles are contained in said medium, where Ns is the index of refraction of the surrounding medium; and Nm, θm, and θs are the index of refraction, angle of incidence, and angle of refraction of the base material of the optical medium respectively.

12. The communication system according to claim 4, wherein the light beam exciting from at least one output edge of said sheet-type optical conductor follows Snell's Law in the reflection and refraction at said output edge, and said sheet-type optical conductor is made of an optical medium having a shape that satisfies the relationship of $\sin \theta s<1$, if $Nm \cdot \sin \theta m = Ns \cdot \sin \theta s$ when no particles are contained in said medium, where Ns is the index of refraction of the surrounding medium; and Nm, θm, and θs are the index of refraction, angle

of incidence, and angle of refraction of the base material of the optical medium respectively.

13. The communication system according to claim 1, wherein said particles contained in said optical medium are nonmagnetic conductive particles that follow Mie scattering theory.

14. The communication system according to claim 1, wherein said optical medium has an inclined density distribution of said particles.

15. The sheet-type optical conductor to be used in the communication system according to claim 1, wherein said optical conductor is provided with a protective layer that covers the surface of the body of said optical conductor.

16. The sheet-type optical conductor to be used in the communication system according to claim 2, wherein said optical conductor is provided with a protective layer that covers the surface of the body of said optical conductor.

17. The sheet-type optical conductor to be used in the communication system according to claim 3, wherein said optical conductor is provided with a protective layer that covers the surface of the body of said optical conductor.

18. The sheet-type optical conductor to be used in the communication system according to claim 4, wherein said optical conductor is provided with a protective layer that covers the surface of the body of said optical conductor.

19. The sheet-type optical conductor according to claim 15, wherein said optical conductor is further provided with

a cladding layer having a smaller index of refraction than that of said optical conductor body between the surface of said optical conductor body and said protective layer.

20. The sheet-type optical conductor according to claim 16, wherein said optical conductor is further provided with a cladding layer having a smaller index of refraction than that of said optical conductor body between the surface of said optical conductor body and said protective layer.

21. The sheet-type optical conductor according to claim 17, wherein said optical conductor is further provided with a cladding layer having a smaller index of refraction than that of said optical conductor body between the surface of said optical conductor body and said protective layer.

22. The sheet-type optical conductor according to claim 18, wherein said optical conductor is further provided with a cladding layer having a smaller index of refraction than that of said optical conductor body between the surface of said optical conductor body and said protective layer.